

## The group 4 project

### Summary of the group 4 project

The group 4 project is a collaborative activity where students from different group 4 subjects work together on a scientific or technological topic, allowing for concepts and perceptions from across the disciplines to be shared in line with aim 10—that is, to “encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method”. The project can be practically or theoretically based. Collaboration between schools in different regions is encouraged.

The group 4 project allows students to appreciate the environmental, social and ethical implications of science and technology. It may also allow them to understand the limitations of scientific study, for example, the shortage of appropriate data and/or the lack of resources. The emphasis is on interdisciplinary cooperation and the processes involved in scientific investigation, rather than the products of such investigation.

The choice of scientific or technological topic is open but the project should clearly address aims 7, 8 and 10 of the group 4 subject guides.

Ideally, the project should involve students collaborating with those from other group 4 subjects at all stages. To this end, it is not necessary for the topic chosen to have clearly identifiable separate subject components. However, for logistical reasons some schools may prefer a separate subject “action” phase (see the following “Project stages” section).

### Project stages

The 10 hours allocated to the group 4 project, which are part of the teaching time set aside for IA, can be divided into three stages: planning, action and evaluation.

#### Planning

This stage is crucial to the whole exercise and should last about two hours.

- The planning stage could consist of a single session, or two or three shorter ones.
- This stage must involve all group 4 students meeting to “brainstorm” and discuss the central topic, sharing ideas and information.
- The topic can be chosen by the students themselves or selected by the teachers.
- Where large numbers of students are involved, it may be advisable to have more than one mixed subject group.

**After selecting a topic or issue, the activities to be carried out must be clearly defined before moving from the planning stage to the action and evaluation stages.**

A possible strategy is that students define specific tasks for themselves, either individually or as members of groups, and investigate various aspects of the chosen topic. At this stage, if the project is to be experimentally based, apparatus should be specified so that there is no delay in carrying out the action stage. Contact with other schools, if a joint venture has been agreed, is an important consideration at this time.

### Action

This stage should last around six hours and may be carried out over one or two weeks in normal scheduled class time. Alternatively, a whole day could be set aside if, for example, the project involves fieldwork.

- Students should investigate the topic in mixed subject groups or single subject groups.
- There should be collaboration during the action stage; findings of investigations should be shared with other students within the mixed/single subject group. During this stage, in any practically based activity, it is important to pay attention to safety, ethical and environmental considerations.

Note: Students studying two group 4 subjects are not required to do two separate action phases.

### Evaluation

The emphasis during this stage, for which two hours is probably necessary, is on students sharing their findings, both successes and failures, with other students. How this is achieved can be decided by the teachers, the students or jointly.

- One solution is to devote a morning, afternoon or evening to a symposium where all the students, as individuals or as groups, give brief presentations.
- Alternatively, the presentation could be more informal and take the form of a science fair where students circulate around displays summarizing the activities of each group.

The symposium or science fair could also be attended by parents, members of the school board and the press. This would be especially pertinent if some issue of local importance has been researched. Some of the findings might influence the way the school interacts with its environment or local community.

## Addressing aims 7 and 8

**Aim 7**—"develop and apply the students' information and communication technology skills in the study of science".

Aim 7 may be partly addressed at the planning stage by using electronic communication within and between schools. It may be that ICT (for example, data logging, spreadsheets, databases, and so on) will be used in the action phase and certainly in the presentation/evaluation stage (for example, use of digital images, presentation software, web sites, digital video, and so on).

**Aim 8**—"raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology".

The choice of topic should enable one or more elements of aim 8 to be incorporated into the project.

## Addressing the international dimension

There are also possibilities in the choice of topic to illustrate the international nature of the scientific endeavour and the increasing cooperation required to tackle global issues involving science and technology. An alternative way to bring an international dimension to the project is to collaborate with a school in another region.

## Types of project

While addressing aims 7, 8 and 10 the project must be based on science or its applications.

The project may have a hands-on practical action phase or one involving purely theoretical aspects. It could be undertaken in a wide range of ways.

- Designing and carrying out a laboratory investigation or fieldwork.
- Carrying out a comparative study (experimental or otherwise) in collaboration with another school.
- Collating, manipulating and analysing data from other sources, such as scientific journals, environmental organizations, science and technology industries and government reports.
- Designing and using a model or simulation.
- Contributing to a long-term project organized by the school.

## Logistical strategies

The logistical organization of the group 4 project is often a challenge to schools. The following models illustrate possible ways in which the project may be implemented.

Models A, B and C apply within a single school, and model D relates to a project involving collaboration between schools.

## Selecting a topic

Students may choose the topic or propose possible topics, with the teacher then deciding which one is the most viable based on resources, staff availability, and so on. Alternatively, the teacher selects the topic or proposes several topics from which students make a choice.

### Student selection

Students are likely to display more enthusiasm and feel a greater sense of ownership for a topic that they have chosen themselves. A possible strategy for student selection of a topic, which also includes part of the planning stage, is outlined here. At this point, subject teachers may provide advice on the viability of proposed topics.

- Identify possible topics by using a questionnaire or a survey of students.
- Conduct an initial "brainstorming" session of potential topics or issues.
- Discuss, briefly, two or three topics that seem interesting.
- Select one topic by consensus.
- Students make a list of potential investigations that could be carried out. All students then discuss issues such as possible overlap and collaborative investigations.

## Assessment

The group 4 project is to be assessed for the personal skills criterion only and this will be the only place where this criterion is assessed. It is up to the school how this assessment takes place.

Note: The group 4 project is not to be used for the assessment of the other criteria.

### Personal skills (for group 4 project assessment only)

This criterion addresses objective 4.

Levels/marks	Aspect 1	Aspect 2	Aspect 3
	Self-motivation and perseverance	Working within a team	Self-reflection
<b>Complete/2</b>	Approaches the project with self-motivation and follows it through to completion.	Collaborates and communicates in a group situation and integrates the views of others.	Shows a thorough awareness of their own strengths and weaknesses and gives thoughtful consideration to their learning experience.
<b>Partial/1</b>	Completes the project but sometimes lacks self-motivation.	Exchanges some views but requires guidance to collaborate with others.	Shows limited awareness of their own strengths and weaknesses and gives some consideration to their learning experience.
<b>Not at all/0</b>	Lacks perseverance and motivation.	Makes little or no attempt to collaborate in a group situation.	Shows no awareness of their own strengths and weaknesses and gives no consideration to their learning experience.

The assessment can be assisted by the use of a student self-evaluation form, but the use of such a form is not a requirement.

## GROUP 4 PROJECT

## Individual Time Log

Name ..... Group Number.....

**Faculty Advisor .....** **Science and Level .....**

**Title of Project** .....

**This sheet is to keep a record of your work on the Group 4 Project, whether as part of the group, with a partner, or as an individual. You must keep it up-to-date, to help you keep a sense of your progress. You should keep a separate record for each science. Your faculty advisor and subject teacher may ask to see your record from time-to-time. You may obtain an additional sheet if needed from your subject teacher or group advisor.**

[illegible]

# GROUP 4 PROJECT

## Evaluation of Personal Skills

On this form you are asked to evaluate yourself and other members of your entire group with respect to your involvement in the Group 4 Project. This questionnaire is not anonymous; we have to know to whom the evaluations apply. The information you provide will be known only to the faculty members involved in supervising the Group 4 Project this year. The questionnaire is meant to fulfill several purposes:

1. to encourage you to reflect on your experience of the Project in terms of the personal skills you and other members of the group were able to contribute
2. to provide information to help us improve the experience of the Group 4 Project
3. to provide information in addition to our own observations concerning the contributions of members of the group

A. Please enter the names of the members of your group below

Student number	Name	Student number	Name
1. (Your name):		5	
2.		6	
3.		7	
4.			

B. Evaluate yourself (student 1) and each of the other members of your group on each of the skills listed in the table below.

Use the following evaluation scale: 1 = did not display the skill at all

2 = displayed the skill to some extent

3 = did all that could be expected in this respect

N = I did not have an opportunity to observe this skill

Personal Skills	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7
Accepted responsibility to contribute to team							
Encouraged the contributions of others							
Recognized the contributions of others							
Showed self-motivation and perseverance							
Showed ethical behavior in personal relations and reporting results							
Paid due attention to environmental impacts							

C. Please answer the following questions. (use the back of this page or attach additional pages if needed.)

What did you do well as a group?

What problems did you encounter in working as a member of your group?

What suggestions can you make for improving the functioning of a group in the future?

Thank you. Please return this form to the faculty advisor for your group by ~~10/1~~

GROUP 4 PROJECT  
INTERNATION BACCALAUREATE PROGRAM  
GEORGE WASHINGTON HIGH SCHOOL (0315)  
DENVER, COLORADO  
USA

NAME \_\_\_\_\_  
DATE \_\_\_\_\_

## GROUP POSTER PRESENTATIONS

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions



Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Subject area / Group subject / Question addressed

Observations

Conclusions

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

Subject area / Group subject / Question addressed

Observations

Conclusions

---

---

## Conclusion and evaluation

Levels/marks	Aspect 1	Aspect 2	Aspect 3
	Concluding	Evaluating procedures	Improving the investigation
<b>Complete/2</b>	States a conclusion, with justification, based on a reasonable interpretation of the data.	Evaluates weaknesses and limitations.	Suggests realistic improvements in respect of identified weaknesses and limitations.
<b>Partial/1</b>	States a conclusion based on a reasonable interpretation of the data.	Identifies some weaknesses and limitations, but the evaluation is weak or missing.	Suggests only superficial improvements.
<b>Not at all/0</b>	States no conclusion or the conclusion is based on an unreasonable interpretation of the data.	Identifies irrelevant weaknesses and limitations.	Suggests unrealistic improvements.

## Manipulative skills (assessed summatively)

This criterion addresses objective 5.

Levels/marks	Aspect 1	Aspect 2	Aspect 3
	Following instructions	Carrying out techniques	Working safely
<b>Complete/2</b>	Follows instructions accurately, adapting to new circumstances (seeking assistance when required).	Competent and methodical in the use of a range of techniques and equipment.	Pays attention to safety issues.
<b>Partial/1</b>	Follows instructions but requires assistance.	Usually competent and methodical in the use of a range of techniques and equipment.	Usually pays attention to safety issues.
<b>Not at all/0</b>	Rarely follows instructions or requires constant supervision.	Rarely competent and methodical in the use of a range of techniques and equipment.	Rarely pays attention to safety issues.

\*Instructions may be in a variety of forms: oral, written worksheets, diagrams, photographs, video, charts, audio tapes, models, computer programs, and so on, and need not originate from the teacher.

See "The group 4 project" section for the personal skills criterion.

**Design**

Levels/marks	Aspect 1 Defining the problem and selecting variables	Aspect 2 Controlling variables	Aspect 3 Developing a method for collection of data
<b>Complete/2</b>	Formulates a focused problem/research question and identifies the relevant variables.	Designs a method for the effective control of the variables.	Develops a method that allows for the collection of sufficient relevant data.
<b>Partial/1</b>	Formulates a problem/research question that is incomplete or identifies only some relevant variables.	Designs a method that makes some attempt to control the variables.	Develops a method that allows for the collection of insufficient relevant data.
<b>Not at all/0</b>	Does not identify a problem/research question and does not identify any relevant variables.	Designs a method that does not control the variables.	Develops a method that does not allow for any relevant data to be collected.

**Data collection and processing**

Levels/marks	Aspect 1 Recording raw data	Aspect 2 Processing raw data	Aspect 3 Presenting processed data
<b>Complete/2</b>	Records appropriate quantitative and associated qualitative raw data, including units and uncertainties where relevant.	Processes the quantitative raw data correctly.	Presents processed data appropriately and, where relevant, includes errors and uncertainties.
<b>Partial/1</b>	Records appropriate quantitative and associated qualitative raw data, but with some mistakes or omissions.	Processes quantitative raw data, but with some mistakes and/or omissions.	Presents processed data appropriately, but with some mistakes and/or omissions.
<b>Not at all/0</b>	Does not record any appropriate quantitative raw data or raw data is incomprehensible.	No processing of quantitative raw data is carried out or major mistakes are made in processing.	Presents processed data inappropriately or incomprehensibly.

Group reports and individual evaluations  
should be given to the group advisor.

## **A SEQUENCE OF SKILLS FOR GROUP WORK**

### **Forming Skills (Skills to start work of group)**

- Welcoming and inviting one another
- Moving into groups quietly
- Staying with the group
- Using quiet voices
- Encouraging everyone to participate
- Paying attention to the record of the groups' work
- Looking at the speaker
- Using no "put-downs"
- Listening attentively to others

### **Functioning Skills (Skills to help group function effectively)**

- Inviting ideas of others
- Stating and restating the purpose of the assignment
- Setting or calling attention to time limits
- Offering procedures on how to most effectively do task
- Expressing support and acceptance verbally
- Asking for help or clarification
- Offering to explain or clarify
- Paraphrasing and clarifying other members' contributions
- Recognizing and acknowledging quality
- Does not take over/desert the team
- Energizing the group with humor, ideas or enthusiasm
- Describing feelings when appropriate

### **Formulating Skills (Skills to develop plans)**

- Summarizing the material aloud
- Seeking accuracy by correcting and/or adding to summaries
- Seeking elaboration by relating to other learning or knowledge
- Asking members to make their reasoning processes explicit
- Asking members to plan aloud how to accomplish the task
- Assists in individual mastery by others
- Insists on personal mastery and quality

### **Fermenting Skills (Skills to implement plans)**

- Criticizing ideas without criticizing people
- Integrating ideas into a single position
- Asking for justification of others' conclusions or ideas
- Extending other members' answers or conclusions
- Probing by asking questions that lead to deeper analysis
- Generating further answers
- Testing reality by checking group's work against constraints of time  
and human and material resources